## 08.0 CONSTRUCTION SYSTEMS II

**Prerequisites**: Fundamentals of Technology
Construction Systems I

Students of Construction Systems II continue their study of structural systems through research, developing solutions, creating designs, building models and critiquing their work. Working individually and as team members, students apply the skills and insights from the previous course to pursue progressively demanding concepts and relationships of structural systems. Students are given greater freedom to explore individual topics of interest within the area of structural systems.

PROGRAM TASK LISTING EFFECTIVE DATE: June 30, 1995

PROGRAM AREA: Technology Education

PROGRAM TITLE: Construction Systems II

IDAHO CODE NUMBER: TE 1921

08.01 Demonstrate the ability to work safely with a variety of technologies.

08.02 Demonstrate interpersonal skills as they relate to the workplace.

08.03 Identify and apply methods of information acquisition and utilization.

08.04 Apply basic skills in communications, mathematics, and science appropriate to technological content and learning activities.

08.05 Demonstrate and apply design/problem-solving processes.

08.06 Express an understanding of technological systems and their complex interrelationships.

08.07 Demonstrate the ability to properly identify, organize, plan, and allocate resources.

08.08 Discuss individual interests and aptitudes as they relate to a career choice.

08.09 Demonstrate employability skills and habits.

08.10 Demonstrate an understanding of entrepreneurship.

08.11 Apply advanced technical knowledge and skills about construction technology.

08.12 Demonstrate technical knowledge and skills about selecting and preparing a construction site.

08.13 Demonstrate technical knowledge and skills about designing and engineering constructed works.

08.14 Demonstrate technical knowledge and skills about contracting, estimating, bidding, and scheduling.

08.15 Demonstrate technical knowledge and skills about constructing substructures.

08.16 Demonstrate technical knowledge and skills about constructing superstructures.

08.17 Demonstrate technical knowledge and skills about installing utilities.

08.18 Demonstrate technical knowledge and skills about enclosing superstructures.

08.19 Demonstrate technical knowledge and skills about interior and exterior finishing of a constructed structure.

08.20 Perform advanced study and technical skills related to construction technology.

08.21 Operate a computer utilizing a program related to construction technology.

08.22 Demonstrate technical knowledge and skills about regional planning and the construction of civil or community structures.

08.23 Conduct structural tests on constructed structures and construction materials.

08.24 Conduct a research and experimentation project on a construction technology process or material.

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08.01 DEMONSTRATE THE ABILITY TO WORK SAFELY WITH A VARIETY OF TECHNOLOGIES--
The student will be able to:

1. Select appropriate tools, procedures, and/or equipment needed to produce a product.

2. Demonstrate the safe usage of appropriate tools, procedures, and operation of equipment needed to produce a product.
3. Demonstrate knowledge required to maintain and troubleshoot equipment used in a variety of technological systems.
4. Demonstrate laboratory safety rules and procedures.
5. Demonstrate good housekeeping at work station within total laboratory.
6. Identify color-coding safety standards.
7. Explain fire prevention and safety precautions and practices for extinguishing fires.
8. Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.

08.02 DEMONSTRATE INTERPERSONAL SKILLS AS THEY RELATE TO THE WORKPLACE--

The student will be able to:

1. Perform roles in a student personnel system or in the Technology Student Association (TSA).
2. Participate as a member of a team.
3. Teach others new skills.
4. Identify skills needed to serve clients/customers.
5. Demonstrate leadership skills.
6. Describe strategies necessary for negotiating agreements.
7. Demonstrate the application of skills necessary to work with people of diverse backgrounds.
8. Form an understanding and appreciation for work after listening to or observing technology workers.
9. Form an understanding and appreciation for work after participating in a simulated technology group project in the laboratory.
10. Form an understanding and appreciation for the roles and work of co-workers.

08.03 IDENTIFY AND APPLY METHODS OF INFORMATION ACQUISITION AND UTILIZATION--

The student will be able to:

1. Define terms related to computers.
2. Identify and describe methods of information acquisition and evaluation.
3. Discuss advantages and disadvantages in the application of technologies.
4. Produce a plan to organize and maintain information relevant to emerging technologies.
5. Comprehend and communicate information relevant to emerging technologies.
6. Demonstrate the use of computers to process information.

08.04 APPLY BASIC SKILLS IN COMMUNICATIONS, MATHEMATICS, AND SCIENCE

APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--
The student will be able to:

1. Use the features of books and reference materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, and bibliography.
2. Read and follow complex written directions.
3. Find, understand, and apply information from a variety of sources (books, manuals, newspapers, periodicals, directories, reference works, computer printouts, and other printed matter or electronic sources such as video display terminals).
4. Use and expand general and specialized vocabulary (including abbreviations, acronyms, and concepts) as appropriate to subject areas studied at the grade level.
5. Write Standard English sentences with correct:
   - sentence structure;
   - verb forms;
   - punctuation, capitalization, possessives, plural forms, and other matters of mechanics;
   - word choice and spelling.
6. Answer and ask questions coherently and concisely, and follow spoken instructions.
7. Identify and comprehend the main and subordinate ideas in lectures and discussions, ask questions to clarify information heard, and report accurately what others have said.
8. Perform with accuracy the computations of addition, subtraction, multiplication, and division using natural numbers, fractions, decimals, and integers.
9. Make and use measurements in both traditional and metric units.
10. Formulate and solve problems in mathematical terms, selecting appropriate approaches and tools (mental computation, trial and error, paper-and-pencil techniques, calculator, and computer).
11. Solve work-related problems involving the basic arithmetic operations using whole numbers, fractions, decimals, and percents.
12. Describe the role of observation and experimentation in the development of scientific theories.
13. Gather scientific information through skills in laboratory, field, and library work.
14. Draw conclusions or make inferences from data.
15. Apply basic scientific/technical solutions to the appropriate problems.

08.05 DEMONSTRATE AND APPLY DESIGN/PROBLEM-SOLVING PROCESSES--
The student will be able to:

1. Describe and explain steps in the design/problem-solving process.
2. Propose solutions to given problems.

3. Design and implement the optimal solution to a given problem.
4. Document each step of the design/problem-solving process.
5. Demonstrate "Brainstorming" as a process to solve problems.
6. Define "critical thinking" and its value in the problem-solving process.

08.06 EXPRESS AN UNDERSTANDING OF TECHNOLOGICAL SYSTEMS AND THEIR COMPLEX INTERRELATIONSHIPS--
The student will be able to:

1. Demonstrate knowledge of how social, organizational, and technological systems work.
2. Explore methods used to monitor and correct performance of technological systems.
3. Design and implement an optimal solution to a given problem.
4. Outline major historical technological developments or events.
5. Identify recent advances in technology.
6. Explain problem-solving roles of technology.
7. Forecast a technological development or event.
8. Define technology.

08.07 DEMONSTRATE THE ABILITY TO PROPERLY IDENTIFY, ORGANIZE, PLAN, AND ALLOCATE RESOURCES--
The student will be able to:

1. Demonstrate the ability to select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
2. Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
3. Demonstrate the ability to acquire, store, allocate, and use materials or space efficiently.
4. Display knowledge of the efficient use of human resources.

08.08 DISCUSS INDIVIDUAL INTERESTS AND APTITUDES AS THEY RELATE TO A CAREER CHOICE--
The student will be able to:

1. Describe individual strengths and weaknesses.
2. Discuss individual interests related to a career.
3. Identify careers within specific areas of technology.
4. Explore careers within specific areas of interest.
5. Make a tentative occupational choice based on the information learned and interest developed in this course.
6. Review tentative occupational choices based on the information learned and interest developed in this course.

08.09 DEMONSTRATE EMPLOYABILITY SKILLS AND HABITS--

The student will be able to:

1. Identify employment opportunities.
2. Apply employment seeking skills.
3. Interpret employment capabilities.
4. Demonstrate appropriate work behavior.
5. Maintain safe and healthy environment.
6. Maintain businesslike image.
7. Maintain working relationships with others.
8. Communicate on the job.
9. Adapt to change.
10. Demonstrate knowledge of manufacturing.
11. Perform mathematical calculations.
12. Compile a portfolio.

08.10 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--
The student will be able to:

1. Define entrepreneurship.
2. Describe the importance of entrepreneurship to the American economy.
3. List the advantages and disadvantages of business ownership.
4. Identify the risks involved in ownership of a business.
5. Identify the necessary personal characteristics of a successful entrepreneur.
6. Identify the business skills needed to operate a small business efficiently and effectively.

08.11 APPLY ADVANCED TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--
The student will be able to:

1. Apply advanced technical knowledge and skills about student performance standards.
2. Apply advanced technical knowledge and skills in the construction of a structure.

08.12 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SELECTING AND PREPARING A CONSTRUCTION SITE--
The student will be able to:

1. Explain the steps and processes for identifying, negotiating, selecting, and acquiring sites for construction.
2. Explain and perform the elementary technical skills for surveying or mapping a construction site.
3. Describe the tools, equipment, and technical skills required for excavating a construction site.
4. Explain the load bearing importance of the earth and the reason for soils

testing at a construction site.

08.13 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DESIGNING AND ENGINEERING CONSTRUCTED WORKS--
The student will be able to:

1. Read and interpret architectural drawings, blueprints, symbols, and construction plans.
2. Describe building codes, permits, and inspection requirements.
3. Sketch or draw a plan for a construction project.

08.14 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING--
The student will be able to:

1. Estimate construction costs using various methods including a computer.
2. Read and prepare bid invitations for contractors to build a construction project.
3. Establish criteria for awarding a construction contract.
4. Describe the content of a construction contract and performance bond.

08.15 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUBSTRUCTURES--
The student will be able to:

1. Describe the types, parts, and purposes of foundations.
2. Describe the tools, materials, and processes for setting foundations.
3. Mix, place, and finish concrete for a floor, wall, or footing.
4. Perform the masonry technical skills of laying brick or block.

08.16 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUPERSTRUCTURES--
The student will be able to:

1. Describe mass, solid wall, frame, and air-supported superstructures.
2. Describe the materials used in the construction of superstructures.
3. Use technical carpentry skills, tools, and materials in constructing a wood frame superstructure.
4. Use technical construction skills in building a steel or concrete frame superstructure.
5. Describe factory manufacturing of superstructures and modules.

08.17 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INSTALLING UTILITIES--
The student will be able to:

1. Describe public utility systems for supplying water, electricity, natural gas, and sewerage.
2. Describe the functions and operation of heating, cooling, and ventilating systems.
3. Demonstrate a technical knowledge of plumbing and electrical systems in homes or buildings including home automation and security controls.
4. Use the technical tools and skills to install plumbing and electrical systems utilities.
5. Diagnose and troubleshoot problems with utility systems.

08.18 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENCLOSING SUPERSTRUCTURES--
The student will be able to:

1. Describe the different types of materials and methods for constructing interior and exterior walls.
2. Describe the different types of materials and methods for laying floors and for building roofs.
3. Describe the different types of methods for constructing or installing windows and doors.
4. Describe the purposes, materials, and methods for insulating enclosed superstructures.
5. Perform the technical skills of enclosing a superstructure.

08.19 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERIOR AND EXTERIOR FINISHING OF A CONSTRUCTED STRUCTURE--
The student will be able to:

1. Describe the different types of materials and methods for trimming, painting, and decorating a constructed structure.
2. Describe the types of accessories and fixtures that are installed to finish completed construction.
3. Explain the materials and methods used for the finishing processes of paving and landscaping.
4. Participate in processes of finishing a construction project and site.

08.20 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO CONSTRUCTION TECHNOLOGY--
The student will be able to:

1. Select an individual or group project in cooperation with the teacher.
2. Develop a written plan of work to carry out the project.
3. Show evidence of technical study in support of the project.
4. Perform skills related to the project.
5. Complete the project as planned.

08.21 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO CONSTRUCTION TECHNOLOGY--
The student will be able to:

1. Collect or produce data on construction technology through the operation of a computer.
2. Estimate construction costs using computer software.
3. Design a structure plan using CAD software.

08.22 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT REGIONAL PLANNING AND THE CONSTRUCTION OF CIVIL OR COMMUNITY STRUCTURES--
The student will be able to:

1. Discuss community and regional planning needs and processes for the construction of roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, and skyscrapers.
2. Develop a scale model of one of the above structures and give a report on the need.

08.23 CONDUCT STRUCTURAL TESTS ON CONSTRUCTED STRUCTURES AND CONSTRUCTION MATERIALS--
The student will be able to:

1. Perform scientific and technical tests on the strength, life, and uses of structures.
2. Perform scientific and technical tests on a variety of construction materials.

08.24 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON A CONSTRUCTION TECHNOLOGY MATERIAL OR PROCESS--
The student will be able to:

1. Identify a problem.
2. State a need to research the problem.
3. Form a hypothesis about the problem.
4. Plan the procedures for researching the problem.
5. Conduct the research following the planned procedures.
6. Present the research findings in a seminar.
7. State conclusions based on the research findings.